

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:  
a module substrate having a first main surface and a second  
5 main surface facing with the first main surface;  
a plurality of substrate-cite interconnects disposed on the  
first main surface;  
a semiconductor chip having top and bottom surfaces, being  
mounted with a flip chip configuration, configured such that the top  
10 surface of the semiconductor chip facing to the first main surface of  
said module substrate so as to be aligned with said substrate-cite  
interconnects;  
a plurality of joints connected to said substrate-cite  
interconnects, respectively;  
15 a circuit board having top and bottom surfaces;  
a plurality of board-cite interconnects disposed on the top  
surface of the circuit board, each being connected to one of said  
joints; and  
a first heat conductive material thermally connecting the  
20 bottom surface of said semiconductor chip with the top surface of  
said circuit board.
2. The semiconductor device of claim 1, further comprising a  
heat conductive plate in contact with said first heat conductive  
25 material.
3. The semiconductor device of claim 2, further comprising a  
second heat conductive material in contact with said heat conductive  
plate and connecting thermally said heat conductive plate with the  
30 bottom surface of said semiconductor chip.
4. The semiconductor device of claim 1, further comprising an  
active element region disposed at the top surface of said  
semiconductor chip and a plurality of bonding pads surrounding the  
35 active element region, the bonding pads disposed at the peripheral  
region on the top surface of said semiconductor chip.

5. The semiconductor device of claim 4, further comprising a plurality of bumps, each of bumps is sandwiched between one of said bonding pads and one of the said substrate-cite interconnects.

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6. The semiconductor device of claim 5, further comprising a sealing resin inserted between the top surface of said semiconductor chip and said first main surface of said module substrate.

10 7. The semiconductor device of claim 6, wherein said sealing resin is selectively disposed on the peripheral region of said semiconductor chip so as not to contact with the active element region.

15 8. The semiconductor device of claim 7, further comprising a coat-prevention film selectively contacted with the first main surface, disposed just above the active element region.

20 9. The semiconductor device of claim 7, further comprising a resin-blocking groove, selectively dug at the first main surface, disposed just above the active element region.

25 10. The semiconductor device of claim 1, further comprising a chip-shaped circuit component disposed on the first main surface.

11. The semiconductor device of claim 1, further comprising a plurality of back interconnects disposed on the second main surface.

30 12. The semiconductor device of claim 11, further comprising a plurality of via metals, each connecting one of said back interconnects to one of corresponding substrate-cite interconnects.

35 13. The semiconductor device of claim 12, further comprising a chip-shaped circuit component disposed on the second main surface, being configured to connect with one of said back interconnects.

14. The semiconductor device of claim 1, further comprising a dielectric spacer disposed on the first main surface, the dielectric spacer having substantially same thickness as that of said semiconductor chip, enclosing said semiconductor chip and at least partly said joint.

15. The semiconductor device of claim 14, wherein said substrate-cite interconnects are sandwiched between said dielectric spacer and the first main surface.

16. A method of assembling a semiconductor device, comprising: preparing a module substrate having the first main surface and the second main surface facing to said first main surface, a plurality of substrate-cite interconnects being formed on said first main surface;

forming bumps on each of end portions of said substrate-cite interconnects;

mounting a semiconductor chip by a flip chip configuration, facing a top surface thereof to said first main surface, configured such that bonding pads disposed on the top surface of the semiconductor chip contact respectively with said bumps;

forming a plurality of joints on other end portions of said substrate-cite interconnects, respectively; and

mounting said module substrate on a circuit board, configured such that said joints connect to corresponding board-cite interconnects disposed on a top surface of the circuit board, and thermally connecting a bottom surface of said semiconductor chip with the top surface of said circuit board.

17. The method of claim 16, further comprising inserting a sealing resin selectively between the peripheral region of said semiconductor chip and the first main surface, configured such that the sealing resin does not contact with an active element region on the top surface of said semiconductor chip.

18. The method of claim 17, further comprising delineating a coat-prevention film on the first main surface before said mounting.

5 19. The method of claim 16, further comprising forming a dielectric spacer on the first main surface, the dielectric spacer having a chip window designed for disposing said semiconductor chip and a plurality of joint windows designed for disposing said joints, configured such that at each bottoms of the joint windows one of said end portions of said substrate-cite interconnects is exposed.

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20. The method of claim 19, wherein said mounting mounts said semiconductor chip in the chip window, and said forming automatically aligns and positions a plurality of ball electrodes serving as said joints in respective joint windows.

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